ELEMENTARY EQUATIONS

SUSAN THORPE
Great Missenden, Buckinghamshire, England
thorpeds@hotmail.com

Elements with atomic numbers 1 to 92 are the naturally occurring elements. For 86 of these I can offer mathematical proof of their atomic numbers by assigning alphabetical values to the letters of the element. This is done by using one or more of the functions + - x ÷ √.

Only ERBIUM (68) and HAFNIUM (72) produce their atomic numbers by adding all their letters together.

1. **HYDROGEN** $(8 + 25 - 4 - 18) \div (-15 + 7 + 5 + 14) = 1$
2. **HELIUM** $-1 + 5 - (12 \times \sqrt{9}) + 21 + 13 = 2$
3. **LITHIUM** $(12 \times \sqrt{9}) - 20 - 8 + \sqrt{9} - 21 + 13 = 3$
4. **BERYLLIUM** $2 - 5 - 18 \times (25 - 12 - 12) - 9 + 21 + 13 = 4$
5. **BORON** $(2 - 15 + 18) \times (15 - 14) = 5$
6. **CARBON** $(-[3 \times 1] + [18 \div 2]) \times (15 - 14) = 6$
7. **NITROGEN** $(14 - 9 + 20 - 18) \times (-15 + 7 - 5 + 14) = 7$
8. **OXYGEN** $-15 + 24 + 25 - 7 - 5 - 14 = 8$
9. **FLUORINE** $-6 - 12 + 21 - 15 + (18 \div 9) + 14 + 5 = 9$
10. **NEON** $14 - 5 + 15 - 14 = 10$
11. **SODIUM** $19 - 15 - 4 + \sqrt{9} + 21 - 13 = 11$
12. **MAGNESIUM** $(13 \times [1 + 7]) - 14 - (5 \times 19) + 9 + 21 - 13 = 12$
13. **ALUMINIUM** $1 + 12 + 21 + 13 - 9 - 14 - \sqrt{9} - 21 + 13 = 13$
14. **SILICON** $19 + 9 - 12 + (9 \times 3) - 15 - 14 = 14$

15. PHOSPHORUS $16 + 8 - 15 + 19 + 16 + 8 - 15 + 18 - 21 - 19 = 15$

16. SULPHUR $(19 - 21) \times (- 12 - 16 + 8 + 21) + 18 = 16$

17. CHLORINE $3 + 8 - 12 + 15 + ([18 - 9] \div [\sqrt{(14 - 5]}) = 17$

18. ARGON $(1 \times [- 18 + 7]) + 15 + 14 = 18$

19. POTASSIUM $16 - 15 + 20 - 1 - 19 + 19 - 9 + 21 - 13 = 19$

20. CALCIUM $3 + 1 + 12 + 3 + 9 - 21 + 13 = 20$

21. SCANDIUM $(19 - 3 - 1 - 14) \times (4 + 9 + 21 - 13) = 21$

22. TITANIUM $20 + 9 - (20 \times 1) + 14 - 9 + 21 - 13 = 22$

23. VANADIUM $22 + 1 + 14 + 1 - 4 - \sqrt{9} - 21 + 13 = 23$

24. CHROMIUM $3 + ([- 8 + 18] \times [15 - 13) + 9 - 21 + 13 = 24$

25. MANGANESE $13 - 1 + 14 - 7 + 1 - 14 - 5 + 19 + 5 = 25$

26. IRON $9 + 18 - 15 + 14 = 26$

27. COBALT $3 + 15 + 2 - 1 - 12 + 20 = 27$

28. NICKEL $(14 \times [\sqrt{9} - 3]) + 11 + 5 + 12 = 28$

29. COPPER $3 + 15 + \sqrt{16} - 16 + 5 + 18 = 29$

30. ZINC

31. GALLIUM $7 - 1 + 12 + 12 + 9 - 21 + 13 = 31$

32. GERMANIUM $(7 + 5 + 18 - 13 + 1 + 14) \times (9 - 21 + 13) = 32$

33. ARSENIC $1 - 18 + 19 + 5 + 14 + 9 + 3 = 33$

34. SELENIUM $19 + (5 \times 12) - (5 \times 14) - 9 + 21 + 13 = 34$

35. BROMINE $(2 \times 18) + (15 - 13) - (9 \div \sqrt{[14 - 5]}) = 35$

36. KRYPTON $(- 11 + 18 + \sqrt{25} + \sqrt{16} + 20) \times (15 - 14) = 36$

37. RUBIDIUM 18 + 21 + 2 + 9 + 4 - 9 - 21 + 13 = 37

38. STRONTIUM (19 + 20 + 18 + 15 - 14 - 20) x (9 - 21 + 13) = 38

39. YTTRIUM 25 + (20 ÷ 20) + 18 + √9 - 21 + 13 = 39

40. ZIRCONIUM 26 + 9 + 18 + 3 + 15 - 14 - 9 - 21 + 13 = 40

41. NIOBIUM 14 + √9 + 15 - 2 + √9 + 21 - 13 = 41

42. MOLYBDENUM 13 - 15 + 12 + 25 + 2 + 4 - 5 + 14 - 21 + 13 = 42

43. TECHNETIUM √(20 + 5) x (3 + 8) + 14 + 5 - 20 - √9 - 21 + 13 = 43

44. RUTHENIUM 18 + 21 + (20 x 8) + 5 - (14 x 9) - 21 - 13 = 44

45. RHODIUM 18 + ([- 8 + 15] x 4) - 9 + 21 - 13 = 45

46. PALLADIUM 16 + 1 + 12 + (12 x 1) + 4 + 9 - 21 + 13 = 46

47. SILVER - 19 + 9 + 12 + 22 + 5 + 18 = 47

48 CADMIUM - (3 ÷ 1) + (4 x 13) - 9 + 21 - 13 = 48

49. INDIUM - 9 - 14 - 4 + (√9 x 21) + 13 = 49

50. TIN

51. ANTIMONY - 1 + 14 - 20 - 9 + 13 + 15 + 14 + 25 = 51

52. TELLURIUM 20 + 5 + 12 - 12 + 21 - (18 ÷ 9) + 21 - 13 = 52

53. IODINE √9 - 15 + 4 - 9 + (14 x 5)v = 53

54. XENON

55. CAESIUM - 3 + 1 - 5 + 19 + 9 + 21 + 13 = 55

56. BARIUM ([- 2 x 1] + 18 - 9) x (21 - 13) = 56

57. LANTHANUM (12 x 1) - 14 + 20 - 8 - 1 + 14 + 21 + 13 = 57

58. CERIUM (3 x 5) + 18 - 9 + 21 + 13 = 58

59. PRASEODYMIUM 16 - 18 + 1 - 19 + 5 + 15 + 4 + 25 - 13 + 9 + 21 + 13 = 59

60 NEODYMIUM ($\sqrt{}$[14 - 5] + 15 + 4 + 25 + 13) x (9 - 21 + 13) = 60

61. PROMETHIUM ([{16 + 18}] x [15 - 13] + 5 - 20 + 8) x (9 - 21 + 13) = 61

62. SAMARIUM 19 + 1 + (13 x 1) + 18 + $\sqrt{}$9 + 21 - 13 = 62

63. EUROPIUM 5 + 21 + 18 - 15 - 16 + ($\sqrt{}$9 x 21) - 13 = 63

64. GADOLINIUM 7 – 1 - 4 - 15 + (12 x 9) - 14 - 9 - 21 + 13 = 64

65. TERBIUM (20 x 5) - (18 x 2) + 9 - 21 + 13 = 65

66. DYSPROSIUM (4 - 25 + 19 + 16 + 18 + 15 + 19) x (9 - 21 + 13) = 66

67. HOLMIUM 8 + 15 - 12 + 13 + 9 + 21 + 13 = 67

68. ERBIUM 5 + 18 + 2 + 9 + 21 + 13 = 68

69. THULIUM 20 - 8 + 21 + 12 + ($\sqrt{}$9 x [21 - 13]) = 69

70. YTTERBIUM (25 + 20 + $\sqrt{}$[20 + 5] + 18 + 2) x (9 - 21 + 13) = 70

71. LUTETIUM - 12 - 21 + (20 x 5) - 20 + ($\sqrt{}$9 x [21 - 13]) = 71

72. HAFNIUM 8 + 1 + 6 + 14 + 9 + 21 + 13 = 72

73. TANTALUM 20 - 1 + 14 + (20 x 1) + 12 + 21 - 13 = 73

74. TUNGSTEN 20 + 21 + (14 ÷ 7) - 19 - 20 + (5 x 14) = 74

75. RHENIUM 18 - 8 + (5 x 14) + $\sqrt{}$9 - 21 + 13 = 75

76. OSMIUM ([- 15 + 19] x 13) + ([$\sqrt{}$9 x (21 - 13]) = 76

77. IRIDIUM 9 - 18 + (9 x 4) + ($\sqrt{}$9 x 21) - 13 = 77

78. PLATINUM 16 + 12 + 1 + 20 + 9 - 14 + 21 + 13 = 78

79. GOLD

80. MERCURY - 13 + 5 + (18 x 3) + 21 + 18 - √25 = 80

81. THALLIUM 20 + 8 + 1 - 12 - 12 + (√9 x 21 + 13) = 81

82. LEAD

83. BISMUTH (2 x 9) + 19 + 13 + 21 + 20 - 8 = 83

84. POLONIUM 16 + 15 + ([– 12 + 15] x 14) + √9 + 21 – 13 = 84

85. ASTATINE - 1 + 19 + 20 - 1 + 20 + 9 + 14 + 5 = 85

86. RADON

87. FRANCIUM 6 + 18 + ([- 1 + 14] x 3) + (√9 x [21 - 13]) = 87

88. RADIUM (18 x 1) + (4 x 9) + 21 + 13 = 88

89. ACTINIUM ([- 1 + 3] x [20 + 9]) + 14 + 9 + 21 - 13 = 89

90. THORIUM (20 x 8) - 15 - 18 - √9 - 21 - 13 = 90

91. PROTACTINIUM 16 + 18 + 15 + 20 + 1 - 3 + 20 - 9 + 14 - 9 + 21 - 13 = 91

92. URANIUM ([{21 - 18} x 1] x 14) + (√9 x 21) - 13 = 92